

ATTACHMENT J.4.103

FUNCTIONAL REQUIREMENTS DOCUMENT

ED-12-4001

CONTROL NUMBER

SITE PROCEDURE ED-12-4001

REVISION NO. 2

FUNCTIONAL REQUIREMENTS DOCUMENT

ED-12-4001

Effective Date: August 15, 1997

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8/11/97
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8/11/97
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FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

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Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work.</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No. 2
	Page 1 of 21	

TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
1.0	PURPOSE	3
2.0	SCOPE	3
3.0	REFERENCES	3
4.0	RESPONSIBILITIES	3
5.0	GENERAL	4
6.0	PREREQUISITES	4
7.0	PROCEDURE	5
7.1	PROJECT PLANNING ACTIVITIES	5
7.2	DEVELOP THE FUNCTIONAL REQUIREMENTS DOCUMENT	5
7.3	REVIEW THE FUNCTIONAL REQUIREMENTS DOCUMENT	6
7.4	APPROVE AND ISSUE FUNCTIONAL REQUIREMENTS DOCUMENT	6
8.0	RECORDS	6
9.0	DRIVERS	6
10.0	DEFINITIONS	6

LIST OF ATTACHMENTS

<u>ATTACHMENT</u>	<u>TITLE</u>	<u>PAGE</u>
A	FUNCTIONAL REQUIREMENTS DOCUMENT CHECKLIST	8
B	OUTLINE OF TYPICAL FUNCTIONAL REQUIREMENTS DOCUMENT	21

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No. 2
	Page 2 of 21	

RECORD OF ISSUE/REVISIONS

<u>DATE</u>	<u>REV. NO</u>	<u>DESCRIPTION AND AUTHORITY</u>
11/15/93	A.	New document to describe Project Functional Requirement and Feasibility Engineering Support per Request No. S93-167, initiated by Erick Reynolds.
09/16/94	0	This procedure supersedes ENG-02-1201, "Project Functional Requirements and Feasibility Engineering Support", initiated by Ron Worsley.
01/10/97	1	Revised to include user comments and update to current format, initiated by F. Jebens.
08/15/97	2	Revised to update to current re-engineered Fluor Daniel Fernald, (FDF) organizational structure initiated by G. C. Olbur.

Title: FUNCTIONAL REQUIREMENTS DOCUMENT**DOCUMENT NO: ED-12-4001**

Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work.

Effective Date: 08/15/97**Revision No. 2****Page 3 of 21****1.0 PURPOSE**

The purpose of this procedure is to provide guidance in the development and review of the Functional Requirements Document to be implemented within the Fluor Daniel Fernald (FDF) Engineering Design Functional Area.

2.0 SCOPE

This procedure applies to early activities of a project where functional requirements including technical, safety, and environmental requirements are defined for the project purpose, mission, and/or direction.

3.0 REFERENCES

1. ED-12-3001, "Engineering Design Initiation"
2. ED-12-4002, "Conceptual Design Report"
3. ~~ED-12-4003, "Design Criteria Package"~~
4. ED-12-4004, "Design Package"
5. ED-12-4010, "Design Verification"
6. ED-12-5001, "Engineering/Construction Document Control"
7. ED-12-9002, "Value Engineering Process"
8. ~~MS-1021, "Project Management"~~

4.0 RESPONSIBILITIES

Control Account Manager (CAM) - The responsible manager of funded activity with overall financial accountability who plans, requests, and/or authorizes activities within the approved baseline.

Project Manager (PM) - A functional position in which the designated person is in charge of managing and directing the project functions to which they are assigned. An experienced individual assigned to coordinate, integrate, and/or oversee activities for a specific project including scope, cost, schedule, quality, and customer/participant satisfaction. (See Site Procedure MS-1021, "Project Management")

Project Engineer (PE) - An individual assigned to prepare, coordinate, and/or integrate activities to develop the FRD.

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 06/15/97	Revision No. 2
	Page 4 of 21	

5.0 GENERAL

The engineering design process begins with the development of functional requirements and progresses through conceptual design, establishment of design criteria and preliminary and definitive design. For projects assigned Performance Grade (PG) 1 through PG-3, three conceptual design documents shall be developed in sequence leading to the Preliminary Design efforts. These are the FRD, the Conceptual Design Report, and the Design Criteria Package (for projects assigned PG-4 or PG-5, these documents are optional, however, functional requirements should be identified in some baseline document.) The Conceptual Design document and the Design Criteria Packages build upon information provided in the FRD. As the first document in the process, it is important that the FRD provide as much specific information as possible.

The FRD provides the fundamental technical criteria and design requirements necessary to develop conceptual, preliminary, and detailed design. These criteria and requirements address design concepts such as minimum performance capabilities/margins, design basis criteria, diversity, reliability, independence, redundancy, separation, environmental protection, and health and safety protection. The criteria incorporate organizational requirements, DOE directives, regulatory requirements, industry standards and codes, engineering experience, and historical information which provide the basis for verifying that the final project product conforms to the requirements of the intended function. (See Attachment A).

An outline of a FRD is provided in Attachment B. Additional technical guidance is presented in the Guidelines for Preparing Functional Requirements Documents. The more detailed and complex a project, the more detailed the requirements in the FRD. For small projects of short duration, the FRD may be much simpler. The amount of detail that is appropriate for a specific project must be determined and justified by the information that is provided in the FRD to proceed to preliminary design. It may not be necessary to develop a Conceptual Design Report. The level of detail is determined by the PM/PE, as described in the Project Execution Plan which is developed per Site Procedure MS-1021, "Project Management."

Requirements documents such as Records of Decision (ROD), Remediation Work Plans (such as RD/RA), or other OEPA and USEPA documents, may be provided as part of or in place of the suggested FRD format if the necessary information (See Definition 10.3) is contained therein.

6.0 PREREQUISITES

Approved baseline and funding.

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work.</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No. 2
	Page 5 of 21	

7.0 **PROCEDURE**

7.1 **PROJECT PLANNING ACTIVITIES**

PROJECT MANAGER (PM)/PROJECT ENGINEER (PE)

1. Prepare requirements for subcontract support, if required. (See Site Procedure ED-12-2005.)
2. Initiate alignment/kickoff meeting according to Site Procedure ED-12-3001.
3. Prepare the Project Execution Plan (PEP) as a result of the above meeting in accordance with Site Procedure MS-1021, "Project Management." For Projects that require Readiness Assessments (RA) or Operational Readiness Reviews (ORR), the PEP is mandatory.
4. Detail project scope, level of detail, objectives, constraints, and manpower assignments.

7.2 **DEVELOP THE FUNCTIONAL REQUIREMENTS DOCUMENT (FRD)**

PROJECT ENGINEER (PE)

1. Analyze the project to identify the project's specific needs and components.
 - a. Initiate a value engineering approach according to Site Procedure ED-12-9002, as necessary.
 - b. Consider all aspects of the system from the earliest stages of design through development, test, operation, and closeout including environmental tracking as identified in agency documents like RD/RA work plans.
 - c. Ensure that the total system has been considered, including facilities, utilities, hardware, software, personnel, and procedures.
 - d. Consider all the S/RID interfaces as identified in RM-0016 including regulatory agency approved documents which impact the project. (See Site Procedure ED-12-4004, "Design Package," Attachment B for a comprehensive list)
 - e. Verify that requirements can be tracked from a function to all of its elements; from an element to its functions; and from a specific requirement to its contractual constraint.

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work.</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No. 2
	Page 6 of 21	

7.2 DEVELOP THE FUNCTIONAL REQUIREMENTS DOCUMENT (cont.)

2. Evaluate each component in detail using the checklist in Attachment A.

Note: Use of a team approach to these tasks will ensure that all aspects of the project are identified early.

3. Use the format suggested in Attachment B as appropriate.

7.3 REVIEW THE FUNCTIONAL REQUIREMENTS DOCUMENT (FRD)

PROJECT ENGINEER (PE)

1. Conduct reviews in accordance with Site Procedure ED-12-4010, "Design Verification."
2. Submit for appropriate review and comment.
3. Resolve comments and incorporate.

7.4 APPROVE AND ISSUE FUNCTIONAL REQUIREMENTS DOCUMENT

PROJECT MANAGER

1. Issue approved FRD to the customer through ECDC.

8.0 RECORDS

The following records will be generated as a result of this procedure:

- 8.1 Copies of the approved FRD.
- 8.2 All other correspondence directing action will be processed per Site Procedure ED-12-5001, "Engineering/Construction Document Control."

9.0 DRIVERS

1. RM-0012, "Quality Assurance Program"
2. RM-0016, "Management Plan"

10.0 DEFINITIONS

- 10.1 Conceptual Design - The formative engineering stage in the design of a system, process, or facility based on user requirements established and accepted by management that establishes the location, size, capacity, and functional need of the project and justifies continued design development.

Title: FUNCTIONAL REQUIREMENTS DOCUMENT	DOCUMENT NO: ED-12-4001	
Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work	Effective Date: 08/15/97	Revision No. 2
	Page 7 of 21	

10.0 DEFINITIONS (cont.)

- 10.2 Conceptual Engineering - A phase of engineering, after Feasibility Engineering, which advances the project through the conceptual design documents and Design Criteria Package for the Preliminary Design (Title I) Phase.
- 10.3 Functional Requirements Document (FRD) - Those technical data and other project information developed during the project identification phase. They define the project scope, requirements, design parameters, applicable design codes, standards, and regulations (including 10CFR and 40CFR requirements); applicable health, safety, fire protection, safeguards, security, energy conservation, ALARA concepts, and quality assurance requirements; and other requirements such as Records of Decision, Remediation Work Plans, Safety Assessments, Auditable Safety Records, Safety Analysis Reports, etc. The project functional criteria, developed using project alignment and value engineering principles, are normally consolidated into a document which provides the technical base for any further design performed after the criteria are developed.
- 10.4 Design Documents - Those controlled documents that define either the design requirements or the design basis of the facility. Design documents include, but not limited to, design specifications, design criteria, feasibility studies, conceptual design reports (CDR's), calculations, design analyses, design drawings, summary design documents, setpoint determinations, vendor submittals, correspondence with DOE including regulatory agreements that contain design commitments, and other documents that define the facility design. These documents are based on requirements identified early in the engineering process.
- 10.5 Project Engineer (PE) - An engineer responsible for document preparation, coordination, and/or performance of engineering functions for a project. A signature by the Project Engineer indicates that the issues involved with Unresolved Safety Questions,(USQ), Configuration Management(CM), Change Proposal,(CP), and interdisciplinary reviews have been resolved.
- 10.6 Project Execution Plan - Defines the technical scope of the effort detailed to a level commensurate with the nature of the effort. Anticipated deliverables shall be incorporated into the scope with their schedule and budget. Project execution plans are intended to be factual, short, and summary documents. The plan shall address the elements of control as well as other information needed for good work management.
- 10.7 Project Manager (PM) - A functional position in which the designated person is in charge of managing and directing the project functions to which they are assigned. An experienced individual assigned to coordinate, integrate, and/or oversee activities for a specific project including scope, cost, schedule, quality, and customer/participant satisfaction. (See Site Procedure MS-1021, "Project Management").

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No. 2
	Page 8 of 21	

ATTACHMENT A

FUNCTIONAL REQUIREMENTS DOCUMENT (FRD) CHECKLIST

1. FACILITY REQUIREMENTS

1.1 NEW FACILITY

ATTACHED N/A

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | 1.1.1 Briefly describe the purpose of this facility. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.1.2 What are the possible locations? Have the proposed locations been defined by the Site Work Plan? What are the reasons for proposing the locations: isolation, available land, close to other related facilities, utility availability? |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.1.3 How large a facility is required (total square footage number of offices, multi-level, etc.)? |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.1.4 Describe each of the spaces required in the facility (offices, conference rooms, shop areas, rest and locker rooms, storage areas, process area). |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.1.5 Describe additional space required other than the basic building (parking, roads, staging areas, dock)? |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.1.6 How many people will occupy this facility (full-time, part-time)? |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.1.7 Are there any underground (abandoned or currently used) utilities, process or waste lines, or tanks, etc., in the proposed locations? |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.1.8 Describe any projected plans or needs for expansion or future additions. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.1.9 List additional special plans or needs for expansion for this facility. |

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No. 2
	Page 9 of 21	

FUNCTIONAL REQUIREMENTS DOCUMENT (FRD) CHECKLIST (continued)

1.2 MODIFICATIONS TO AN EXISTING FACILITY

ATTACHED N/A

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | 1.2.1 Briefly describe the purpose of this facility. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.2.2 What is the proposed location? (room number, column line, etc.). What is the reason for proposing this location (close to related facilities, utility availability)? Will other processes or personnel be required to relocate into or out of the proposed location? |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.2.3 Describe the removals required. Describe the new construction. What is the proposed equipment layout? (A floor plan or glovebox layout may be helpful.) |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.2.4 Are there any layout requirements or restrictions (direction of material flow, overhead restrictions, etc.)? |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.2.5 Describe required personnel and material access into the area to be modified (double doors, loading dock, air lock). |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.2.6 Where is the nearest available loading dock? Describe access path from this dock to the area. |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.2.7 Are there any projected plans or need for expansion or future additions? |
| <input type="checkbox"/> | <input type="checkbox"/> | 1.2.8 Are there any projected plans or need for design reconstitution or determination of material condition or ageing? |

ATTACHMENT A (continued)

FUNCTIONAL REQUIREMENTS DOCUMENT (FRD) CHECKLIST (continued)

2. UTILITY REQUIREMENTS

ATTACHED

N/A

☐
☐

2.1 What utilities and services are required (plant air, instrument air, nitrogen, chemicals, argon, helium, steam, natural gas, process water, cooling water, sewer, process waste, ventilation, electricity, emergency and other power, LAN, chemicals, etc.)?

☐
☐

2.2 Describe special power requirements (UPS, 220V or 480V, separate circuits, etc.).

☐
☐

2.3 Are the required services and utilities available in the area? In the building? If so, where are they located?

☐
☐

2.4 Describe any special temperature or humidity requirements.

3. PROCESS REQUIREMENTS

3.1 PROCESS DESCRIPTION

☐
☐

3.1.1 Describe the major process flow sequence or steps.

☐
☐

3.1.2 Describe the systems needed to support the facility.

☐
☐

3.1.3 Describe the characteristics of the inputs and outputs (phase, pH, temperature, pressure, composition, density, particle size, viscosity, etc.).

3.2 CAPACITY REQUIREMENTS

☐
☐

3.2.1 Provide the feed and product rates (lbs/hr, GPM, pieces/hr, etc.) for the overall process and individual processes. Provide normal and maximum rates.

☐
☐

3.2.2 Is excess capacity required for the overall or individual processes? How much?

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No. 2
	Page 11 of 21	

ATTACHMENT A (continued)

FUNCTIONAL REQUIREMENTS DOCUMENT (FRD) CHECKLIST (continued)

3.3 STORAGE AND HANDLING REQUIREMENTS

ATTACHED N/A

☐ ☐ 3.3.1 Are there any feed, product or interim storage requirements (surge tanks, staging areas, etc.)? Describe type and capacity.

☐ ☐ 3.3.2 What is the residence time for storage? Are there any special handling requirements.

4. OPERATING REQUIREMENTS

4.1 OPERATING ASSUMPTIONS

☐ ☐ 4.1.1 How many operating shifts per week, weeks per year?

☐ ☐ 4.1.2 Describe planned outages (type, number, duration) for preventive maintenance or other purposes.

4.2 OPERATING PROVISIONS

☐ ☐ 4.2.1 Describe requirements for startup, normal operating, and shutdown conditions.

☐ ☐ 4.2.2 Describe requirements for standby, emergency, and infrequent operating conditions (emergency power, instrument air, etc.).

☐ ☐ 4.2.3 Is there a need for uninterrupted operation?

☐ ☐ 4.2.4 Describe equipment accessibility requirements and locations of other items (gloveports, platforms, etc.) in relation to the equipment.

☐ ☐ 4.2.5 Describe any design features deemed to assist operations (viewports, platforms, etc.).

☐ ☐ 4.2.6 Describe required or desired operator training (manufacturer course, computer training, etc.).

☐ ☐ 4.2.7 Describe required documentation (operations manual or operational records).

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No. 2
	Page 12 of 21	

ATTACHMENT A (continued)

FUNCTIONAL REQUIREMENTS DOCUMENT (FRD) CHECKLIST (continued)

5. DESIGN REQUIREMENTS

5.1 EQUIPMENT AND CONTROLS (SMALL TASK DETAIL ONLY)

ATTACHED

N/A

☐
☐

5.1.1 Provide a major component list and description of the process equipment (size, capacity, materials of construction, etc.).

☐
☐

5.1.2 Provide description of the types of controls required or desired (level, temperature, flow, etc.). Will the controls be remote or manual? Control room or local panel? What type of central control is requires (panel, controllers, etc.).

☐
☐

5.1.3 Is redundant equipment or processor required?

☐
☐

5.1.4 What are the single failure points?

☐
☐

5.1.5 Are there software requirements? Who will develop and test the software?

5.2 TESTING PROVISIONS (SMALL TASK DETAIL ONLY)

☐
☐

5.2.1 Is sampling and testing required (type, frequency, sampling, storage, time interval for results)? Sample ports?

☐
☐

5.2.2 What types of records and verifications are required during operation?

☐
☐

5.2.3 What are the calibration requirements (tanks, instruments, etc.).

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work.</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No. 2
	Page 13 of 21	

ATTACHMENT A (continued)

FUNCTIONAL REQUIREMENTS DOCUMENT (FRD) CHECKLIST (continued)

5.3 MAINTENANCE PROVISIONS (SMALL TASK DETAIL ONLY)

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 5.3.1 Describe equipment accessibility requirements (gloveports, platforms, etc.). |
| <input type="checkbox"/> | <input type="checkbox"/> | 5.3.2 Describe required preventive maintenance (type, frequency, inspections, etc.). |
| <input type="checkbox"/> | <input type="checkbox"/> | 5.3.3 Will maintenance be performed remote or manual? What area will be allocated to maintenance (within process area or special maintenance area)? |
| <input type="checkbox"/> | <input type="checkbox"/> | 5.3.4 Are any special tools or unusual spare parts required for maintenance? |
| <input type="checkbox"/> | <input type="checkbox"/> | 5.3.5 Describe requirements for preparing for maintenance dismantling and repair (plastic hose, crane, etc.). |
| <input type="checkbox"/> | <input type="checkbox"/> | 5.3.6 Is the manufacturer's technical services required? |
| <input type="checkbox"/> | <input type="checkbox"/> | 5.3.7 What is the allowable downtime for repair/preventive maintenance? |

6. INTERRELATIONSHIPS WITH OTHER PROCESSES, FACILITIES, AND SUPPORT SERVICES

6.1 INTERRELATIONSHIP WITH OTHER PROCESSES

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | 6.1.1 Describe any processes which either feed into or are fed by this process. |
| <input type="checkbox"/> | <input type="checkbox"/> | 6.1.2 What other processes/operations (besides utilities) must be operating for this process to operate? |

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work.</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No: 2
	Page 14 of 21	

ATTACHMENT A (continued)

FUNCTIONAL REQUIREMENTS DOCUMENT (FRD) CHECKLIST (continued)

6.2 INTERRELATIONSHIP WITH OTHER FACILITIES

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | 6.2.1 Describe the relationships between this process/facility and other facilities. |
| <input type="checkbox"/> | <input type="checkbox"/> | 6.2.2 What other facilities must be operating (besides utilities) for this process or facility to operate? |

6.3 INTERRELATIONSHIP WITH SUPPORT SERVICES (SMALL TASK DETAIL ONLY)

ATTACHED N/A

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 6.3.1 What support services are required both during and after installation (laboratory support, trucking, etc.). |
| <input type="checkbox"/> | <input type="checkbox"/> | 6.3.2 Describe any outside (non-FDF) support services required. |

7. RADIOACTIVE, HAZARDOUS AND MIXED MATERIALS (NON-WASTE)

7.1 RADIOACTIVE MATERIALS

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 7.1.1 Describe any radioactive materials to be generated or handled (form, type, amount). |
| <input type="checkbox"/> | <input type="checkbox"/> | 7.1.2 Describe how it will be handled, packaged, stored, and transported. |

7.2 HAZARDOUS MATERIALS

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 7.2.1 Describe any hazardous materials (form, type, amount). |
| <input type="checkbox"/> | <input type="checkbox"/> | 7.2.2 Describe how it will be handled, packaged, stored, and transported. |

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work.</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No. 2
	Page 15 of 21	

ATTACHMENT A (continued)

FUNCTIONAL REQUIREMENTS DOCUMENT (FRD) CHECKLIST (continued)

7.3 MIXED MATERIALS (RADIOACTIVE AND HAZARDOUS)

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | 7.3.1 Describe any mixed (radioactive and hazardous) materials (form, type, amount) expected to be generated during construction or final operation. |
| <input type="checkbox"/> | <input type="checkbox"/> | 7.3.2 Describe how it will be handled, packaged, stored, and transported. |

8. WASTE MANAGEMENT

8.1 RADIOACTIVE WASTE

ATTACHED N/A

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | 8.1.1 Describe any radioactive waste (form, type, amount). |
|--------------------------|--------------------------|--|

8.2 HAZARDOUS MATERIALS

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 8.2.1 Describe any hazardous waste (form, type, amount). |
| <input type="checkbox"/> | <input type="checkbox"/> | 8.2.2 Describe the disposition of this waste (storage, further processing, etc.). |

8.3 MIXED WASTE (HAZARDOUS AND RADIOACTIVE)

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 8.3.1 Describe any mixed waste (form, type, amount). |
| <input type="checkbox"/> | <input type="checkbox"/> | 8.3.2 Describe the disposition of this waste (storage, further processing, off plant-site, etc.). |

8.4 REGULATORY REQUIREMENTS

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 8.4.1 What documentation is required or has existing requirements? |
| <input type="checkbox"/> | <input type="checkbox"/> | 8.4.2 What permits are needed or affected? |
| <input type="checkbox"/> | <input type="checkbox"/> | 8.4.3 Are there any design features required to meet any regulatory requirements? |

ATTACHMENT A (continued)

FUNCTIONAL REQUIREMENTS DOCUMENT (FRD) CHECKLIST (continued)

Title: FUNCTIONAL REQUIREMENTS DOCUMENT

DOCUMENT NO: ED-12-4001

Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work

Effective Date: 09/15/97

Revision No 2

Page 16 of 21

9. HEALTH, SAFETY, AND ENVIRONMENT

9.1 RADIATION SAFETY

☐ ☐ 9.1.1 Is shielding required?

☐ ☐ 9.1.2 Describe any design features required for contamination control (down draft tables, airlock's, containments, etc.).

9.2 NUCLEAR CRITICALITY SAFETY

ATTACHED N/A

☐ ☐ 9.2.1 Describe any nuclear safety hazard (fire suppression systems, etc.).

☐ ☐ 9.2.2 Describe any design features required for nuclear criticality safety (locked valves, HEPA filters, criticality drains, in-line filters, sampling etc.).

9.3 INDUSTRIAL HYGIENE

☐ ☐ 9.3.1 Describe any known Industrial Hygiene hazards (toxic materials, noise, heat, non-ionizing radiation).

☐ ☐ 9.3.2 Describe any design features required for Industrial Hygiene (noise-control, ventilation hoods, sanitation, etc.).

9.4 INDUSTRIAL SAFETY

☐ ☐ 9.4.1 Describe any Industrial Safety hazards (elevated work, working clearances, tripping hazards, etc.).

☐ ☐ 9.4.2 Describe any design features required for Industrial Safety (equipment guards, railings, safety showers, emergency stop buttons, etc.).

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work.</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No. 2
	Page 17 of 21	

ATTACHMENT A (continued)

FUNCTIONAL REQUIREMENTS DOCUMENT (FRD) CHECKLIST (continued)

9.5 SAFETY ANALYSIS

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | 9.5.1 Define the allowable exposure to personnel of radiological or toxic materials. |
| <input type="checkbox"/> | <input type="checkbox"/> | 9.5.2 What are the required facility classifications? |
| <input type="checkbox"/> | <input type="checkbox"/> | 9.5.3 Describe ALARA alternatives. |

9.6 FIRE PROTECTION

ATTACHED N/A

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 9.6.1 Describe any fire hazards (flammable liquids, solids, solvents, etc.) and their control requirements. |
| <input type="checkbox"/> | <input type="checkbox"/> | 9.6.2 Describe any design features required (sprinklers, dry chemical, inserting, etc.). |

9.7 ENVIRONMENTAL PROTECTION AND POLLUTION CONTROL

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 9.7.1 Describe all required environmental protection documentation (NEIA, NPDES, Clean Air Act, etc.). |
| <input type="checkbox"/> | <input type="checkbox"/> | 9.7.2 Describe expected liquid effluent or airborne emissions to the environment (type, amount, Ph, concentrations, listed waste, etc.). |
| <input type="checkbox"/> | <input type="checkbox"/> | 9.7.3 Describe design features required for environmental protection (filtration, scrubbing, treatment, retention, sampling, and analysis, etc.). |
| <input type="checkbox"/> | <input type="checkbox"/> | 9.7.4 Describe countermeasures for emissions/spill control (retention berms, process drains, ventilation control, double containment, etc.). |

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work.</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No. 2
	Page 18 of 21	

ATTACHMENT A (continued)

FUNCTIONAL REQUIREMENTS DOCUMENT (FRD) CHECKLIST (continued)

10. IMPACTS DURING PROJECT EXECUTION (SMALL TASKS DETAIL ONLY)

10.1 IMPACTS TO OPERATIONS

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 10.1.1 Describe any expected impacts to operations during construction and testing (e.g., maximum allowable operations shutdown or impact on other operations). |
| <input type="checkbox"/> | <input type="checkbox"/> | 10.1.2 Describe any expected impacts to operations during startup (e.g., maximum allowable operations shutdown or impact on other operations). |

10.2 ENVIRONMENTAL CONSIDERATIONS

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | 10.2.1 Describe any known unusual impacts to the environment during construction and testing or reference previously approved documents. |
| <input type="checkbox"/> | <input type="checkbox"/> | 10.2.2 Describe any known unusual health and safety conditions, limitations, or impacts. |

11. RELATIONS TO OTHER PROJECTS

11.1 OTHER PROJECTS IN CONSTRUCTION

ATTACHED N/A

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 11.1.1 Describe other projects which are in design or construction in the near vicinity at the same time. |
| <input type="checkbox"/> | <input type="checkbox"/> | 11.1.2 What common design features could be used (G.B. exhaust, widening doors, etc.). |

11.2 FUTURE PROJECTS

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 11.2.1 Describe the relationship of this project to future projects. |
| <input type="checkbox"/> | <input type="checkbox"/> | 11.2.2 Are there any design features which need to be considered with respect to future projects (larger ducts, utility upgrade, etc.)? |

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work.</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No. 2
	Page 19 of 21	

ATTACHMENT A (continued)

FUNCTIONAL REQUIREMENTS DOCUMENT (FRD) CHECKLIST (continued)

12. QUALITY ASSURANCE PROVISIONS (SMALL TASK DETAIL ONLY)

12.1 QA CONSIDERATIONS

☐ ☐ 12.1.1 What are the anticipated Quality Assurance Levels (QAL) for this project?

☐ ☐ 12.1.2 What are the product QA requirements (inspections, documentation, acceptance requirements)?

13. SAFEGUARDS AND SECURITY

13.1 NUCLEAR MATERIAL PHYSICAL SAFEGUARDS

☐ ☐ 13.1.1 Describe any physical safeguards which could cause a problem during the life of this project.

☐ ☐ 13.1.2 Describe requirements for locks, detection and alarm, and remote surveillance.

13.2 NUCLEAR MATERIAL ACCOUNTABILITY

ATTACHED N/A

☐ ☐ 13.2.1 Define the methods of measurement and recording.

☐ ☐ 13.2.2 What is the inventory frequency, method, and duration.

13.3 SECURITY

☐ ☐ 13.3.1 Describe protection of classified information and materials, such as sensitive or high-risk property.

☐ ☐ 13.3.2 Describe any special security requirements.

Title: FUNCTIONAL REQUIREMENTS DOCUMENT <i>Compliance with this procedure is mandatory while performing the activities within its scope. Only a controlled copy may be used in the performance of work.</i>	DOCUMENT NO: ED-12-4001	
	Effective Date: 08/15/97	Revision No. 2
	Page 20 of 21	

ATTACHMENT A (continued)

FUNCTIONAL REQUIREMENTS DOCUMENT (FRD) CHECKLIST (continued)

14. COMMUNICATIONS REQUIREMENTS

14.1 LOCAL REQUIREMENTS

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 14.1.1 Describe the visual communication requirements (visual monitors, etc.). |
| <input type="checkbox"/> | <input type="checkbox"/> | 14.1.2 Describe the audio communication requirements (intercom, phones, horns, etc.). |

14.2 COMMUNICATION WITH PLANT

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 14.2.1 Describe number of telephones, LAN, phone lines for computers, guard phones, plant PA systems. |
| <input type="checkbox"/> | <input type="checkbox"/> | 14.2.2 Describe all alarms required (fire, criticality, etc.) not described elsewhere. |

15. DECONTAMINATION AND DECOMMISSIONING (D&D) (SMALL TASKS DETAIL ONLY)

15.1 SCOPE OF D&D PRIOR TO CONSTRUCTION

ATTACHED N/A

- | | | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | 15.1.1 Describe any D&D work involved (equipment #'s, pipe, etc.). |
| <input type="checkbox"/> | <input type="checkbox"/> | 15.1.2 What are the levels and types of contamination? |
| <input type="checkbox"/> | <input type="checkbox"/> | 15.1.3 What is the expected quantity of waste generated? |
| <input type="checkbox"/> | <input type="checkbox"/> | 15.1.4 List of equipment to be salvaged. |

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	Effective Date: 08/15/97	Revision No. 2
	Page 21 of 21	

ATTACHMENT B

OUTLINE OF TYPICAL FUNCTIONAL REQUIREMENTS DOCUMENT (FRD)

<u>Section</u>	<u>Contents</u>
1.0	Introduction
2.0	Scope
3.0	General Functional Requirements
3.1	Technical
3.2	Safety
3.3	Environmental
4.0	Regulatory Requirements
5.0	Nuclear Safety and Radiation Protection Requirements
6.0	DOE/Site Requirements
6.1	Quality Assurance
6.2	Natural Phenomena Design
6.3	Maintenance and Operations
6.4	Safeguards and Security
6.5	Health & Safety
6.6	Energy Conservation
6.7	Decontamination and Decommissioning (D&D)
6.8	Human Factors Engineering
6.9	Emergency Planning
6.10	Fire Protection
6.11	Uncertainties, Contingencies, and Effort to Resolve Uncertainties
6.12	Telecommunications
6.13	Computers
6.14	DOE O 430.1, Life Cycle Asset Management
7.0	Reference Materials
8.0	Specific Functional Requirements
9.0	Project Milestones
10.0	Project Schedule